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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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| APPELLANTS: | Andres Sommer | GROUP ART UNIT: 2882 |
| SERIAL NO.: | 09/495,710 | EXAMINER: Hoon Song |
| FILED: | February 1, 2000 | CONFIRMATION NO.: 5203 |
| TITLE: | **"COMPUTED TOMOGRAPHY APPARATUS"** | |

**MAIL STOP APPEAL BRIEF-PATENTS**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

## APPELLANT'S MAIN BRIEF ON APPEAL

S I R:

In accordance with the provisions of 37 C.F.R. §1.192, Appellant herewith submits his main brief in support of the appeal of the above-referenced application.

## REAL PARTY IN INTEREST:

The real party in interest is the assignee of the present application, Siemens Aktiengesellschaft, a German corporation.

## RELATED APPEALS AND INTERFERENCES:

There are no related appeals and no related interferences.

## STATUS OF CLAIMS:

Claims 1-7 are on appeal, and constitute all pending claims of the application. No claims were added or canceled during prosecution.

## STATUS OF AMENDMENTS:

No amendment was filed following the final rejection.

## SUMMARY OF THE INVENTION:

Figure 1 shows a computed tomography apparatus having a gantry 1 with a measuring opening 2, which is surrounded by a rotary ring 3 on which an x-ray

source 4 and a curved detector 5 are mounted. The x-ray source 4 emits a fan-shaped x-ray bundle (not shown) that is incident on the detector 5, which is curved around the focus of the x-ray source 4 and which is formed by a series of individual detectors. (p. 4, l. 12-16)

By means of rollers 6 on parallel rails (only one is visible in Figure 1), the gantry 1 is movable in the direction of the double arrow z by a motor drive 8 (shown in broken lines in Figure 1). This movement is independent of a support table 9 on which a support plate 10 for a patient to be examined is situated. (p. 4, l. 17-20)

For producing computed tomographic images, the gantry 1 with the x-ray source 4 and the detector 5 is moved from a standby position (not shown) relative to the support table 9, into a use position in which the support plate 10 of the support table 9 extends through the measuring opening 2 of the gantry 1, as is necessary for producing computed tomographic images of the patient. (p. 4, l. 21 – p. 5, l. 2) For purposes of producing an image of a planar slice of the patient, the rotary ring 3 with the x-ray source 4 and the detector 5 is rotated around the system axis Z for the acquisition of a number of projection datasets with the x-ray source 4 irradiating the patient on the support plate 10 respectively from different directions. (p. 5, l. 2-6) These projection datasets serve the purpose of reconstructing a tomogram in a known manner. During this data acquisition the gantry 1 remains stationary on the rails 7 and the support table 9 remains stationary on the wheels 11. (p. 5, l. 6-9)

The gantry 1 can be moved into the use position, since the support plate 10 of the support table 9 has one end attached cantilevered to a carrier, which is fashioned as a floor stand 12 that is movable on the wheels 11. (p. 5, l. 10-12) Due the movability of the gantry 1 on the rails 7 and due the movability of the support

table 9 on the wheels 11 of its floor stand 12, longitudinal displaceability of the support plate 10 relative to the floor stand 12 is not necessary, thus allowing the support plate 10 to be attached to the floor stand 12 in a non-displaceable manner. (p. 5, l. 12-16)

Therefore, the support table 10 is not of a type as is conventional in computed tomography, with a support plate that can be displaced relative to a carrier. (p. 5, l. 17-18) Instead, the support table 10 of the inventive apparatus has a significantly simpler structure which, due to the cantilevered support plate 10, enables the placement of the gantry 1 into a use position corresponding to the type of examination so that the support plate 10 extends through the measuring opening 3. (p. 5, l. 18-22) For this purpose, it is only necessary to place the support table 9 coarsely in such a position, so that an area of the patient that is to be examined can be reached by adjusting the gantry 1 on the rails 7. (p. 5, l. 22-p. 6, l. 2)

Due to the motor-driven adjustability of the gantry 1 in the direction of the system axis Z, there is also the possibility of undertaking volume scans of a relevant examination area of the patient. In a known manner, such volume scans can be carried out as sequence scans or as spiral scans. (p. 6, l. 3-6) In the case of sequence scanning, a stepped displacement of the gantry 1 in the direction of the system axis Z ensues after scanning of a planar slice of the examination area until the relevant examination area is scanned in the form of a sequence of planar slices. (p. 6, l. 6-9) In the case of a spiral scan, the rotary ring 3 rotates continuously, while the gantry 1 is continuously mixed in the direction of the system axis Z, whereby the rotating speed of the rotary ring 3 and the translational speed of the gantry 1, in the

direction of the system axis Z, have a fixed ratio to one another corresponding to the desired pitch of the spiral scan. (p. 6, l. 9-13)

The computed tomography apparatus shown in Figure 2 differs from the embodiment of Figure 1 in that the support table 13 has a ceiling stand 13 as a carrier for the support plate 17. The ceiling stand 13 can be moved by rollers 14 always two parallel ceiling rails 15 (only one is visible in Figure 2). (p. 6, l. 14-17)

Analogously to the previously described exemplary embodiment, the support plate 17 of the support table 13 in the embodiment of Figure 2 is attached to the ceiling stand 14 in a non-displaceable manner, however, there is the possibility to pivot the bearing plate 17 around the center axis 18 of the ceiling stand 14 in the direction of the curved double arrow $\alpha$. (p. 6, l. 18-22)

As shown in Figure 3, it is therefore possible to conduct examinations with swivel, wherein the support table 13 and the gantry 1 are positioned relative to one another such that the straight lines cross (intersect), which are respectively generated by parallel projections of the longitudinal axis 19 of the support plate 17 and the system axis in a horizontal plane, for example, on the floor of the examination room when the gantry 1 (as shown in Figure 3) is in a use position in which the support plate 17 extends through the measuring opening 3 of the gantry 1. (p. 7, l. 1-7)

In the exemplary embodiment according to Figure 1, the support table 9 and the gantry 1 can be positioned relative to one another such that examinations with swivel are possible. (p. 7, l. 8-10)

The fashioning of the support tables 9 and 13 in the described exemplary embodiments is only an example. The important feature of the inventive apparatus

is that the support table 9 or 13 is constructed such that the gantry 1 can be moved into a use position in which the plate 10 or 17 extends through the measuring opening of the gantry 1. (p. 7, l. 11-15)

In the exemplary embodiments, only one support table 9 or 13 is shown. In the context of the invention, however, a number of support tables can be provided in order to be able to prepare a number of patients at the same time in the interest of an optimal use of the computed tomography apparatus, so that examinations of the individual patients can ensue immediately in succession. (p. 7, l. 16-20)

**ISSUES:**

The issues presented for review are:

Whether the subject matter of claims 1, 2 and 4-7 would have been obvious to a person of ordinary skill in the field of mobile x-ray apparatus design, under the provisions of 35 U.S.C. §103(a), based on the teachings of United States Patent No. 5,848,126 (Fujita et al) in view of United States Patent No. 3,803,417 (Kok); and

Whether the subject matter of claim 3 would have been obvious to a person of ordinary skill in the field of mobile x-ray apparatus design under the provisions of 35 U.S.C. §103(a) based on the teachings of Fujita et al and Kok, further in view of the teachings of United States Patent No. 6,125,163 (Barth).

**GROUPING OF CLAIMS:**

The patentability of claims 1-7 stands or falls together.

**ARGUMENT:**

Independent claim 1 is directed to a computed tomography apparatus and explicitly requires, among other things, a gantry having a measuring opening, a support table having a support plate, on which an examination subject can be

received, and a carrier with the support plate on-displaceably mounted cantilevered to the carrier, and a mechanism for moving the gantry independent of the support table into a position wherein the support plate extends through the measuring opening.

The Fujita et al. reference discloses a computed tomography apparatus having a gantry with a measurement opening, but teaches a displaceably mounted support plate. The Examiner stated that it would have been obvious to a person of ordinary skill in the art to employ the support plate disclosed in the Kok reference, that is non-displaceably mounted on a movable carrier, instead of the displaceably mounted support plate disclosed in all embodiments of the Fujita et al. reference.

The Examiner stated a person of ordinary skill in the art would be motivated to employ the non-displaceable mount because it would eliminate the movement mechanism of the support plate, since the source and detector pair is independently moved to position the patient in between.

Appellant respectfully disagrees with the alleged motivation proposed by the Examiner, and further submits that the evidence of record indicates that the conventional thinking in the design of computed tomography systems employing a gantry for rotating the X-ray source and the radiation detector is contrary to the modification proposed by the Examiner.

The imaging system disclosed in the Kok reference is a generally "open" system, wherein the X-ray source and the radiation detector are mounted on a bracket or arm arrangement approximately in the shape of a C. This open arrangement produces very little impediment or restriction to the type of patient support that can be used therewith. Because the system is relatively open, there are

no confining walls or other structure that would impede or dictate the particular type of patient support arrangement that is used. Although the Kok reference discloses a patient support arrangement wherein the support plate is non-displaceably mounted on a mobile stand, no particular importance is attached to the fact that the support plate is non-displaceably mounted on the stand, and a displaceable support plate could just as easily have been used.

By contrast, claim 1 of the present application specifically claims a gantry having a measuring opening therein, with an x-ray source and a radiation detector mounted in the gantry relative to the opening at positions for irradiating a subject placed in the opening. This type of gantry arrangement, as opposed to the open arrangement disclosed in the Kok reference, is much more restrictive and confining as to the type of patient support which can be used therewith. Those of ordinary skill in the field of computed tomography employing a gantry for the x-ray source and the radiation detector have conventionally assumed that it would not be possible, or at least very difficult, to accurately position a support plate with a patient lying thereon in the use position in the gantry without the capability of being able to adjust either the gantry or the support plate.

Such a gantry system, therefore, represents a "closed" structure, in contrast to the open arrangement of the x-ray source and the x-ray image intensifier attached to the free ends of C-shaped or U-shaped carrier.

The Fujita et al. reference itself is strong evidence against the alleged obviousness of modifying that reference to employ a patient support arrangement as described in the Kok reference. In all embodiments disclosed in the Fujita et al. reference, including the embodiment shown in Figure 23A which has a movable

gantry, a patient support arrangement has been used which has a support plate that is displaceably mounted to a stand. Despite the fact that in Figure 23A both the support stand and the gantry are independently movable, the support plate disclosed in that embodiment has still been made to be displaceable on the stand. It has never occurred to those of ordinary skill in the field of computed tomography systems employing a gantry to use a support arrangement for the patient wherein the support plate is stationary with regard to a mobile stand, with the gantry also being independently movable, as set forth in independent claim 1 of the present application.

Appellant therefore respectfully submits the modification of the Fujita et al. reference in accordance with the teachings of the Kok reference has occurred to the Examiner only by hindsight, after the Examiner has first had the benefit of reading the present disclosure. The references of record themselves are ample evidence that such a modification has not occurred to those of ordinary skill in the art. As noted above, the Examiner has suggested a motivation for making such a modification on the basis that a stationarily mounted support plate involves fewer moving parts, and therefore less expense, than a displaceably mounted support plate. While this may be a true statement by itself, even if this fact had occurred to those of ordinary skill in the art of computed tomography employing a gantry system, it clearly has not been sufficient to outweigh the belief that a stationarily mounted support plate does not afford sufficient adjustability in the context of usage with the confined opening which is present in a gantry, as opposed to the relatively open system of the type exemplified by the Kok reference.

Moreover, in assessing obviousness in the manner required to apply 35 U.S.C. §103(a), it is incorrect to imagine a person of ordinary skill in the field of computed tomography system design as having only the Fujita et al and Kok references in front of him or her. Once the Fujita et al and Kok references have been selected, from among the thousands of patents and articles in this field, it is tempting to argue that the subject matter of claim 1 can be determined from those references. It must be remembered, however, that those references had been selected by the Examiner based on a thorough search of the art after having read the present disclosure. Without having had the benefit of reading the present disclosure, a person of ordinary skill seeking to solve the aforementioned problems associated with the design of a system of this type has no idea, and no insight, as to which are the "right" references (or portions of references) for providing a solution to these problems. As argued above, neither of these references provides any teaching or inducement for selection of either of those references in the first place as a solution to the aforementioned problems, and neither of those references provides any teaching or inducement to combine the structures therein in the manner proposed by the Examiner. The Fujita reference, for example, includes many different embodiments, and the Examiner, by having the benefit of first reading the present disclosure, has been able to select just one of the many embodiments disclosed in that reference for combination with the Kok reference. A person of ordinary skill in this art at the time the present invention was made does not have the benefit of the guidance afforded by the present specification, and there is nothing in either of the Fujita et al or Kok references to provide such guidance In fact, for the

reasons noted above, there are persuasive reasons why a person of ordinary skill would be deterred from making the combination proposed by the Examiner.

Claims 1, 2 and 4-7 therefore, would not have been obvious to a person of ordinary skill in the art under the provisions of 35 U.S.C. §103(a) based on the teachings of Fujita et al. and Kok.

Claim 3 adds further structure to the non-obvious combination of independent claim 1, and therefore if the Fujita et al./Kok combination were further modified in accordance with the teachings of Barth, the subject matter of claim 3 still would not result. The Barth et al. system, again, is an example of an open system, wherein the radiation source and the radiation detector are mounted on a C-arm. The impediments, which are imposed by a closed gantry system, of the type, set forth in claim 1 of the present application, therefore do not exist in the Barth et al. reference for the same reasons discussed above in connection with the Kok reference. Claim 3, therefore, would not have been obvious to a person of ordinary skill in the art based on the teachings of Fujita et al. Kok and Barth et al.

**CONCLUSION:**

For the foregoing reasons, Appellant respectfully submits the Examiner is in error in law and in fact in rejecting claims 1-7. Reversal of those rejections are justified, and the same is respectfully requested.

This Appeal Brief is accompanied by a check for the requisite fee in the amount of $330.00.

Submitted by,

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**CERTIFICATE OF MAILING**

I hereby certify that an original and two copies of this correspondence are being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on April 19, 2004.

Steven H. Noll

STEVEN H. NOLL

**APPENDIX "A"**

1. A computed tomography apparatus comprising:

a gantry having a measuring opening;

an x-ray source mounted in said gantry having a focus from which radiation is emitted, at least said focus rotating around said measuring opening for irradiating an examination subject from different directions;

a detector disposed in said opening for obtaining projection datasets corresponding to radiation incident on said detector as said focus rotates around said measuring opening;

a support table having a support plate, adapted to receive an examination subject thereon, and a carrier, said support plate being non-displaceably mounted cantilevered to said carrier; and

a mechanism for moving said gantry independently of said support table, including movement of said gantry into a use position wherein said support plate extends through said measuring opening.

2. A computed tomography apparatus as claimed in claim 1 wherein said carrier comprises a floor stand.

3. A computed tomography apparatus as claimed in claim 1 wherein said carrier comprises a ceiling stand.

4. A computed tomography apparatus as claimed in claim 1 wherein said support table is movable.

5. A computed tomography apparatus as claimed in claim 1 wherein said support table has a longitudinal axis and wherein said gantry has a system axis, and wherein said support table is positionable relative to said gantry so that said longitudinal axis and said system axis, when projected into a horizontal plane, intersect when said gantry is in said use position.

6. A computed tomography apparatus as claimed in claim 1 wherein said gantry has a system axis and further comprising a motor drive for moving said gantry along said system axis to allow scanning of a volume of an examination subject adapted to be received on said support plate in said measuring opening.

7. A computed tomography apparatus as claimed in claim 1 wherein said mechanism comprises rails along which said gantry is movable.

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